

CLAIMS

We claim:

1. A stitch-bonded nonwoven fabric comprising
a nonwoven substrate having basis weight in the range from about 15 to about 150 g/
5 m², and density in the range from about 0.02 to about 0.12 g/cm³,
wherein the nonwoven substrate is bonded with a binder applied to the outer surfaces
of the substrate in a sufficiently uniform manner so that no areas greater than the spaces
between stitch insertion points are devoid of binder and wherein the binder constitutes from
about 2% to about 25% of the total weight of the sum of binder and nonwoven substrate
10 weights, and wherein the substrate is stitch-bonded with yarns arranged in a stitch pattern that
allows the stitch-bonded fabric to be stretched in at least one direction by a factor of about 2.5
to about 5.0 without forming local ruptures therein, and wherein the stitch-bonded nonwoven
fabric can be washed and dried at least twenty times.
- 15 2. The stitch-bonded nonwoven fabric of claim 1, wherein the binder when made into a
solid strip about 0.5 mm thick can stretch to at least a length of about 1.5x the original length
before breaking.
3. The stitch-bonded nonwoven fabric of claim 1, wherein the stitch pattern allows the
20 stitch-bonded fabric to be stretched in the cross-direction.
4. The stitch-bonded nonwoven fabric of claim 1, wherein the nonwoven substrate is
selected from a group consisting of carded staple web, spunlaid continuous filament web,
airlaid staple web.
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5. The stitch-bonded nonwoven fabric of claim 1, wherein the nonwoven substrate is
entangled.
6. The stitch-bonded nonwoven fabric of claim 5, wherein the entanglement occurred
30 before the substrate is bonded with binder.

7. The stitch-bonded nonwoven fabric of claim 5, wherein the entanglement occurred before stitching.

5 8. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied to the nonwoven substrate dissolved in a liquid solvent.

9. The stitch-bonded nonwoven fabric of claim 8, wherein the binder is applied before the nonwoven substrate is stitch-bonded.

10 10. The stitch-bonded nonwoven fabric of claim 8, wherein the binder is applied after the nonwoven substrate is stitch-bonded.

11. The stitch-bonded nonwoven fabric of claim 1, wherein the binder constitutes a portion of the fibers of the nonwoven substrate.

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12. The stitch-bonded nonwoven fabric of claim 11, wherein the binder forms co-extruded or liquid-applied sheaths around the fibers of the nonwoven substrate.

13. The stitch-bonded nonwoven fabric of claim 11, wherein the binder forms co-extruded or liquid-applied a side-by-side portion to the fibers of the nonwoven substrate.

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14. The stitch-bonded nonwoven fabric of claim 11, wherein the nonwoven substrate comprises at least 40% of fibers with binder constituting a portion of the fibers.

25 15. The stitch-bonded nonwoven fabric of claim 14, wherein the nonwoven substrate comprises at least 80% with binder constituting a portion of the fibers.

16. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied in a liquid form.

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17. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied as powder to the nonwoven substrate.

5 18. The stitch-bonded nonwoven fabric of claim 17, wherein the powder comprises thermoplastic powder and is applied with a liquid suspension medium.

19. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied to the substrate before the substrate is stitched.

10 20. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied to the substrate after the substrate is stitched.

21. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied to the substrate after the substrate is stretched.

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22. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is activated before the substrate is stitched.

20 23. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is activated after the substrate is stitched.

24. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is activated after the substrate is stretched.

25 25. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied substantially to the surface of the substrate.

26. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied by spraying.

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27. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied with a doctor knife.

28. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied by
5 foaming.

29. The stitch-bonded nonwoven fabric of claim 1, wherein the stitching yarn is selected from a group consisting of inelastic yarns, textured stretch yarns, elastic yarns and partially
10 molecularly oriented polymer yarns.

30. The stitch-bonded nonwoven fabric of claim 1 is attached to a top panel along the peripheral of the panel, wherein the top panel is adapted to overlay the top surface of a mattress, and wherein the stitch-bonded fabric forms a skirt surrounding the sides of the
15 mattress.

31. The stitch-bonded nonwoven fabric of claim 30, wherein the stitch-bonded fabric is further attached to an elastic band

32. The stitch-bonded nonwoven fabric of claim 31, wherein the elastic band is stitched to
20 an edge of the stitch-bonded fabric opposite to the top panel

33. A multi-layer composite comprising at least one first stitch-bonded nonwoven fabric of claim 1.

25 34. A multi-layer composite comprising a first stitch-bonded nonwoven fabric of claim 1 and a second stitch-bonded nonwoven fabric of claim 1, wherein the first fabric is different than the second fabric.

30 35. The stitch-bonded nonwoven fabric of claim 1, wherein the binder when made into a solid strip about 0.5 mm thick can stretch to at most a length of about 1.5x the original length before breaking.

36. The stitch-bonded nonwoven fabric of claim 35, wherein the binder constitutes from about 2% to about 10% of the total weight of the sum of binder and nonwoven substrate weights.

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37. The stitch-bonded nonwoven fabric of claim 1, wherein the binder comprises a latex binder.

38. The stitch-bonded nonwoven fabric of claim 37, wherein the latex binder is selected from a group consisting of acrylic, styrene acrylates, vinyl acetate, vinyl acrylic, ethylene vinyl acetate (EVA), styrene butadiene rubber (SBR), polyvinyl chloride (PVC) ethylene vinyl chloride binders, and mixtures thereof.

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39. The stitch-bonded nonwoven fabric of claim 37, wherein the latex binder is selected from a group consisting of rubber (copolymer of acrylonitrile and butadiene) and binders containing butadiene, butyl acrylate and 2-ethyl hexyl acrylate.

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40. The stitch-bonded nonwoven fabric of claim 1, wherein the latex binder comprises a polymer, which was polymerized from at least one monomer having a glass temperature of about 80 °C or less.

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41. The stitch-bonded nonwoven fabric of claim 40, wherein the monomer is selected from a group consisting of ethylene, butadiene, butyl acrylate, vinyl acrylate and vinyl chloride.

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42. The stitch-bonded nonwoven fabric of claim 1, wherein the binder comprises polyvinyl acetate (PVA) dispersions or emulsions.

43. The stitch-bonded nonwoven fabric of claim 1, wherein the binder comprises copolymers of polyesters or polyolefins or polyamides.

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44. The stitch-bonded nonwoven fabric of claim 1, wherein the binder is applied before the web is formed on to the surfaces of at least 30% of the fibers exposed on the front and back of the fabric by coating the fibers or by co-extruding the binder with the fibers and wherein substantially all the bonds occur at the crossover intersection points.

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45. The stitch-bonded nonwoven fabric of claim 44, wherein the binder is present on the surfaces of at least 40% of the exposed fibers.

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46. The stitch-bonded nonwoven fabric of claim 45, wherein the binder is present on the surfaces of at least 50% of the exposed fibers.

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47. The stitch-bonded nonwoven fabric of claim 1, wherein the bonds between the fibers in the nonwoven substrate partially break and separate where fibers are at a small angle to each other, and remain in place where fibers intersect at larger angles to each other and make direct contact with each other or indirect contact through the binder bridging across as the product is stretched.

48. A process for forming stretchable stitch-bonded nonwoven fabric comprising the steps of:

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(a) providing a nonwoven substrate having basis weight in the range from about 15 to about 150 g/m²;

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(b) applying and activating a binder to the outer surfaces of the substrate in a liquid form in a sufficiently uniform manner so that no areas greater than the spaces between stitch insertion points are devoid of binder, wherein the binder constitutes from about 2% to about 25% of the total weight of the sum of binder and nonwoven substrate weight, and density in the range from about 0.02 to about 0.12 g/cm³;

(c) stitch-bonding the nonwoven substrate with yarns; and

(d) stretching the substrate.

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49. The process of claim 48, wherein the steps follow the sequence of step (a), step (b), step (c) and then step (d).

50. The process of claim 48, wherein the steps follow the sequence of step (a), step (c), step (b) and then step (d).

5 51. The process of claim 48, wherein the steps follow the sequence of step (a), step (b), step (d) and then step (c).